



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<b>(51) International Patent Classification <sup>5</sup> :</b>  <b>A61K 7/06</b>	<b>A1</b>	<b>(11) International Publication Number:</b> <b>WO 94/08555</b>  <b>(43) International Publication Date:</b> 28 April 1994 (28.04.94)
<b>(21) International Application Number:</b> PCT/US93/09358 <b>(22) International Filing Date:</b> 4 October 1993 (04.10.93)  <b>(30) Priority data:</b> 9221334.7 10 October 1992 (10.10.92) GB 9221333.9 10 October 1992 (10.10.92) GB  <b>(71) Applicant (for all designated States except US):</b> THE PROCTER & GAMBLE COMPANY [US/US]; One Procter & Gamble Plaza, Cincinnati, OH 45202 (US).  <b>(72) Inventors; and</b> <b>(75) Inventors/Applicants (for US only) :</b> PARNELL, Bridget, Anne [IE/GB]; 77 Westborough Road, Maidenhead, Berkshire SL6 4AP (GB). BRIGGS, Gillian, Scott [GB/GB]; 73 Clarence Street, Egham, Surrey TW20 9QY (GB). DATE, Robert, Francis [GB/GB]; 111 St. John's Road, Woking, Surrey GU21 1QB (GB).		<b>(74) Agents:</b> REED, T., David et al.; The Procter & Gamble Company, 5299 Spring Grove Avenue, Cincinnati, OH 45217 (US).  <b>(81) Designated States:</b> AU, BB, BG, BR, BY, CA, CZ, FI, HU, JP, KP, KR, KZ, LK, LV, MG, MN, MW, NO, NZ, PL, RO, RU, SD, SK, UA, US, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.</i>
<b>(54) Title:</b> COSMETIC COMPOSITION COMPRISING A SILICONE/POLYGLYCERYLMETHACRYLATE LUBRICANT  <b>(57) Abstract</b>  A skin or hair care composition in the form of an aqueous gel comprising pre-emulsified silicone/polyglycerylmethacrylate lubricant, hydrophilic gelling agent and an alkoxylated, nonionic surfactant having a weight average HLB of at least about 12 or a humectant having a refractive index in the range from about 1.4-1.5. The compositions provide improved visual clarity, moisturisation, skin feel and skin care benefits, reduced tack and residue characteristics together with excellent, rub-in and absorption characteristics.		

**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	FR	France	MR	Mauritania
AU	Australia	GA	Gabon	MW	Malawi
BB	Barbados	GB	United Kingdom	NE	Niger
BE	Belgium	GN	Guinea	NL	Netherlands
BF	Burkina Faso	GR	Greece	NO	Norway
BG	Bulgaria	HU	Hungary	NZ	New Zealand
BJ	Benin	IE	Ireland	PL	Poland
BR	Brazil	IT	Italy	PT	Portugal
BY	Belarus	JP	Japan	RO	Romania
CA	Canada	KP	Democratic People's Republic of Korea	RU	Russian Federation
CF	Central African Republic	KR	Republic of Korea	SD	Sudan
CG	Congo	KZ	Kazakhstan	SE	Sweden
CH	Switzerland	LI	Liechtenstein	SI	Slovenia
CI	Côte d'Ivoire	LK	Sri Lanka	SK	Slovak Republic
CM	Cameroon	LU	Luxembourg	SN	Senegal
CN	China	LV	Latvia	TD	Chad
CS	Czechoslovakia	MC	Monaco	TG	Togo
CZ	Czech Republic	MG	Madagascar	UA	Ukraine
DE	Germany	ML	Mali	US	United States of America
DK	Denmark	MN	Mongolia	UZ	Uzbekistan
ES	Spain			VN	Viet Nam
FI	Finland				

COSMETIC COMPOSITION COMPRISING  
A SILICONE / POLYGLYCERYLMETHACRYLATE LUBRICANT

Technical Field

The present invention relates to skin- and hair-care cosmetic compositions. In particular it relates to cosmetic compositions in the form of aqueous gels or lotions which provide improved visual clarity, moisturization, skin feel and skin care benefits, reduced tack and residue characteristics together with excellent rub-in and absorption characteristics.

Background of the Invention

Skin is made up of several layers of cells which coat and protect the keratin and collagen fibrous proteins that form the skeleton of its structure. The outermost of these layers, referred to as the stratum corneum, is known to be composed of 25nm protein bundles surrounded by 8nm thick layers. Anionic surfactants and organic solvents typically penetrate the stratum corneum membrane and, by delipidization (i.e. removal of the lipids from the stratum corneum), destroy its integrity. This destruction of the skin surface topography leads to a rough feel and may eventually permit the surfactant or solvent to interact with the keratin, creating irritation.

It is now recognised that maintaining the proper water gradient across the stratum corneum is important to its functionality. Most of this water, which is sometimes considered to be the stratum corneum's plasticizer, comes from inside the body. If the humidity is too low, such as in a cold climate, insufficient water remains in the outer layers of the stratum corneum to properly plasticize the tissue, and the skin begins to scale and becomes itchy. Skin permeability is also decreased somewhat when there is inadequate water across the stratum corneum. On the other hand, too much water on the outside of the skin causes the stratum corneum to ultimately sorb three to five times its own weight of bound water. This swells and puckers the skin and results in approximately a two to three fold increase in the permeability of the skin to water and other polar molecules.

Hair consists of many of the same constituents as the stratum corneum. The outermost region of cells forms a rather thick chemically resistant protective coating enclosing the hair fibre which is called the cuticle. The surface of the cuticle is covered with a thin layer called the epicuticle which is thought to contain lipids and protein. The cuticle envelopes the cortex cells which comprise the major part of the fibre mass. Keratinization takes place in the cortex to build stability into the hair structure.

Thus, a need exists for compositions which will assist the stratum corneum and hair cuticle in maintaining their barrier and water-retention functions at optimum performance in spite of deleterious interactions which the skin and hair may encounter in washing, work, and recreation.

Conventional cosmetic cream and lotion compositions as described, for example, in Sagarin, *Cosmetics Science and Technology*, 2nd Edition, Vol.1, Wiley Interscience (1972) and *Encyclopaedia of Chemical Technology*, Third Edition, Volume 7 are known to provide varying degrees of emolliency, barrier and water-retention (moisturizing) benefits. However, they can also suffer serious negatives in terms of skin feel (i.e. they often feel very greasy on the skin) as well as having poor rub-in, absorption and residue characteristics. In the case of hair-care compositions they can also suffer from resoiling negatives.

In the past, water-soluble polyglycerylmethacrylate lubricants have been incorporated into skin and hair compositions in an attempt to reduce the above problems. These compositions have provided improvements in moisturisation, absorption, skin feel, residue and skin care characteristics compared with conventional cosmetic cream and lotion compositions. They have, however, also suffered negatives such as tackiness, especially when large concentrations of the lubricant are employed. In an attempt to eliminate tackiness from such compositions, microemulsified silicone oil has been added to polyglycerylmethacrylate lubricants. Although this has led to a reduction of tackiness, the visual clarity of the final aqueous compositions is poor. In general, the compositions appear to be opalescent, which some consumers find undesirable.

The present invention therefore provides skin- and hair-care cosmetic compositions which provide improvements in moisturization, absorption, residue, skin feel and skin care characteristics and which in particular provide improvements in tackiness while at the same time maintaining excellent visual clarity.

#### Summary of the Invention

Accordingly, in one aspect of the present invention, there is provided a skin- or hair-care composition in the form of an aqueous gel or lotion comprising:

- a) from about 0.1% to about 50% by weight of pre-emulsified silicone/polyglycerylmethacrylate lubricant,
- b) from about 0.01% to about 20% by weight of hydrophilic gelling agent, and
- c) from about 0.1% to about 40% by weight of alkoxyated, nonionic surfactant, said alkoxyated nonionic surfactant having a weight average HLB value of at least about 12.

In another aspect of the present invention there is provided a skin or hair care composition in the form of a clear, aqueous gel or lotion comprising:

- a) from about 1% to about 30% by weight of humectant or mixture of humectants having a refractive index in the range from about 1.4 to about 1.5,
- b) from about 0.1% to about 50% by weight of pre-emulsified silicone/polyglycerylmethacrylate lubricant, and
- c) from about 0.01% to about 20% by weight of a hydrophilic gelling agent.

The compositions of the present invention contain two essential ingredients as well as various optional and preferred components as indicated below. All levels and ratios are by weight of total composition, unless otherwise indicated. Chain length and degrees of ethoxylation are also specified on a weight average basis.

A first essential component is a pre-emulsified silicone/polyglyceryl-methacrylate lubricant. The pre-emulsified silicone/polyglycerylmethacrylate lubricants which can be used in the compositions of this invention are available under the trademark, Lubrasil (RTM) from Guardian Chemical Corporation, 230 Marcus Blvd., Hauppauge, N.Y. 11787. In general, Lubrasil (RTM) can be described as a merge of silicone oil and polyglyceryl methacrylate lubricant in which the silicone oil is microemulsified using high energy to form a complex.

Suitable polyglycerylmethacrylate lubricants herein include those having a viscosity (neat) of at least about 50,000 mPa.s, preferably at least about 80,000 mPa.s, and mixtures thereof (viscosities being measured with a Brookfield RVT at 20°C).

The polyglycerylmethacrylate lubricants which can be used in making the compositions of this invention are available under the trademark Lubrajel (RTM) from Guardian Chemical Corporation, 230 Marcus Blvd., Hauppauge, N.Y. 11787. In general, Lubrajels can be described as hydrates or clathrates which are formed by the reaction of sodium glycerate with a methacrylic acid polymer. Thereafter, the hydrate or clathrate is stabilized with a small amount of propylene glycol, followed by controlled hydration of the resulting product. Lubrajels are marketed in a number of grades of varying glycerate: polymer ratio and viscosity. Suitable Lubrajels include Lubrajel TW, Lubrajel CG and Lubrajel MS, Lubrajel WA, Lubrajel DV and so-called Lubrajel Oil.

Silicone materials suitable for use in making the silicone/polyglycerylmethacrylate emulsion include both volatile and non-volatile materials and mixtures thereof.

Suitable non-volatile silicones preferably have average viscosity of from about 1,000 to about 2,000,000 mm<sup>2</sup>.s<sup>-1</sup> at 25°C, more preferably from about 10,000 to about 1,800,000 mm<sup>2</sup>.s<sup>-1</sup>, even more preferably from about 100,000 to about 1,500,000 mm<sup>2</sup>.s<sup>-1</sup>. Lower viscosity nonvolatile silicone conditioning agents, however, can also be used. Viscosity can be

measured by means of a glass capillary viscometer as set forth in Dow Corning Corporate Test Method CTM0004, July 20, 1970. Suitable nonvolatile silicone fluids for use herein include polyalkyl siloxanes, polyaryl siloxanes, polyalkylaryl siloxanes, polysiloxanes with amino functional substitutions, polyether siloxane copolymers, and mixtures thereof. The siloxanes useful in the present invention may be endcapped with any number of moieties, including, for example, methyl, hydroxyl, ethylene oxide, propylene oxide, amino and carboxyl. However, other silicone fluids having skin conditioning properties may be used. The nonvolatile polyalkyl siloxane fluids that may be used include, for example, polydimethylsiloxanes. These siloxanes are available, for example, from the General Electric Company as a Viscasil (RTM) series and from Dow Corning as the Dow Corning 200 series. Preferably, the viscosity ranges from about  $10 \text{ mm}^2 \cdot \text{s}^{-1}$  to about  $100,000 \text{ mm}^2 \cdot \text{s}^{-1}$  at  $25^\circ\text{C}$ . The polyalkylaryl siloxane fluids that may be used, also include, for example, polymethylphenylsiloxanes. These siloxanes are available, for example, from the General Electric Company as SF 1075 methyl phenyl fluid or from Dow Corning as 556 Cosmetic Grade Fluid. The polyether siloxane copolymer that may be used includes, for example, a polypropylene oxide modified dimethylpolysiloxane (e.g., Dow Corning DC-1248) although ethylene oxide or mixtures of ethylene oxide and propylene oxide may also be used.

References disclosing suitable silicone fluids include U.S.-A- 2,826,551, Green; U.S.-A- 3,964,500, Drakoff, issued June 22, 1976; U.S.-A- 4,364,837, Pader; and G.B.-A- 849,433, Woolston. In addition, *Silicon Compounds* distributed by Petrarch Systems, Inc., 1984 provides an extensive (though not exclusive) listing of suitable silicone fluids.

The present compositions preferably comprise from about 0.01 % to about 10%, more preferably from about 0.1 % to about 5% by weight of non-volatile silicone expressed as a percentage of the pre-emulsified silicone/polyglyceryl methacrylate lubricant.

Volatile silicone materials suitable for use in making the silicone/polyglyceryl methacrylate emulsion are those having a viscosity of from about  $0.65 \text{ mm}^2 \cdot \text{s}^{-1}$  to about  $10 \text{ mm}^2 \cdot \text{s}^{-1}$  as measured by

Brookfield cone and plate viscometer at 25°C. Certain volatile silicone materials, such as cyclic polydimethylsiloxanes containing from about 3 to about 7 silicon atoms, meet these requirements and are useful herein. A description of volatile silicones is found in Todd and Byers, "Volatile Silicone Fluids for Cosmetics", Cosmetics and Toiletries, 91:27-32 (1976). Other volatile silicones useful herein are taught in US-A-4,874,868, US-A-4,207,424, US-A-4,355,062, US-A-4,376,087 and US-A-4,364,837.

The present compositions preferably comprise from about 0.01 % to about 10%, preferably from about 0.1 % to about 5 % by weight of these volatile pre-emulsified silicone materials expressed as a percentage of the silicone/polyglyceryl methacrylate lubricant. The preferred volatile silicone emollient materials of the present invention are D4-D5 cyclomethicones, phenethyl pentamethyl disiloxane, volatile dimethicone fluid emollient materials having a viscosity of less than 1 centistoke, preferably 0.65 centistokes, and mixtures thereof.

In the present compositions, the pre-emulsified silicone/polyglycerylmethacrylate lubricant is incorporated at a level of from about 0.1 % to about 50%, preferably from about 3 % to about 30%, and more preferably from about 5 % to about 20% by weight of composition.

The compositions of the invention also contain a hydrophilic gelling agent at a level preferably from about 0.01 % to about 20%, more preferably from about 0.05 % to about 3%, and especially from about 0.1 % to about 1%. The gelling agent preferably has a viscosity (1 % aqueous solution, 25°C, Brookfield RVT Viscometer, Spindle TB, 5r.p.m.) of at least about 4000 mPa.s, more preferably at least about 10,000 mPa.s and especially at least 100,000 mPa.s.

Suitable hydrophilic gelling agents can generally be described as water-soluble or colloiddally water-soluble polymers, and include cellulose ethers (e.g. hydroxyethyl cellulose, methyl cellulose, hydroxypropylmethyl



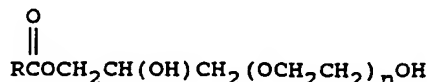
cellulose), polyvinylpyrrolidone, polyvinylalcohol, guar gum, hydroxypropyl guar gum and xanthan gum.

Preferred hydrophilic gelling agents herein, however, are cross-linked methylvinyl ether maleic anhydride (PVM/MA) copolymers sold under the trade name Stabileze (RTM). Other suitable hydrophilic gelling agents for use herein are acrylic acid/ethyl acrylate copolymers and the carboxyvinyl polymers sold by the B.F. Goodrich Company under the trade mark of Carbopol (RTM) resins. These resins consist essentially of a colloiddally water-soluble polyalkenyl polyether crosslinked polymer of acrylic acid crosslinked with from 0.75% to 2.00% of a crosslinking agent such as for example polyallyl sucrose or polyallyl pentaerythritol. Examples include Carbopol 934, Carbopol 940, Carbopol 950, Carbopol 980 and Carbopol 981. Carbopol 934 is a water-soluble polymer of acrylic acid crosslinked with about 1% of a polyallyl ether of sucrose having an average of about 5.8 allyl groups for each sucrose molecule. A most preferred gelling agent for use herein is selected from Stabileze (RTM) 06 (ISP), supplied by ISP (Europe), Carbopol 980, and mixtures thereof. Also suitable for use herein are hydrophobically-modified cross-linked polymers of acrylic acid having amphipathic properties such as those available under the trade name Carbopol (RTM) 1342 and Pemulen TR-1 (CTFA Designation: Acrylates/10-30 Alkyl Acrylate Crosspolymer). Combinations of the polyalkenyl polyether cross-linked acrylic acid polymer with the hydrophobically modified cross-linked acrylic acid polymer or the PVA/MA copolymer, or mixtures thereof are also suitable for use herein.

Neutralizing agents suitable for use in neutralizing acidic group containing hydrophilic gelling agents herein include sodium hydroxide, potassium hydroxide, ammonium hydroxide, monoethanolamine, diethanolamine, triethanolamine, quadrol and tris (hydroxymethyl) aminomethane.

In one aspect of the invention, the compositions of the invention also contain from about 0.1% to about 40%, preferably from about 1% to about 20%, most preferably from about 1% to about 10% by weight of a nonionic surfactant having a weight average hydrophilic lipophilic balance (HLB) value of at least about 12, preferably at least about 14. Suitable

nonionic surfactants for use herein can be selected from several classes of nonionic surfactants. One class of nonionic surfactants suitable herein are polyethyleneglycol glyceryl fatty ester surfactants having the formula (1):



wherein n, the degree of ethoxylation, is from about 4 to about 200, preferably from about 5 to about 100, more preferably from about 6 to about 80, and wherein R comprises an aliphatic radical having from about 5 to about 25 carbon atoms, preferably from about 7 to about 20 carbon atoms.

Suitable glyceryl fatty ester surfactants include polyethyleneglycol derivatives of glyceryl cocoate, glyceryl caproate, glyceryl caprylate, glyceryl tallowate, glyceryl palmate, glyceryl stearate, glyceryl laurate, glyceryl oleate, glyceryl ricinoleate, and glyceryl fatty esters derived from triglycerides, such as evening primrose oil, palm oil, almond oil, and corn oil, preferably glyceryl caproate and glyceryl caprylate.

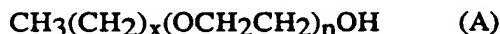
Suitable surfactants of this class are commercially available from Sherex Chemical Co. (Dublin, Ohio, USA) under their Varonic LI line of surfactants. These include, for example, Varonic LI 48 (polyethylene glycol (n = 80) glyceryl tallowate, alternatively referred to as PEG 80 glyceryl tallowate), Varonic LI 2 (PEG 28 glyceryl tallowate), Varonic LI 420 (PRG 200 glyceryl tallowate), and Varonic LI 63 and 67 (PEG 30 and PEG 80 glyceryl cocoates), and from Croda Inc. (New York, USA) under their Crovol line of materials, such as Crovol A-40 (PEG 20 almond glyceride), Crovol A-70 (PEG 60 almond glyceride), Crovol M-40 (PEG 20 maize glyceride), Crovol M-70 (PEG 60 maize glyceride), Crovol PK-40 (PEG 12 palm kernel glyceride), Crovol PK-70 (PEG 45 palm kernel glyceride) and Crovol EP-70 (PEG 70 evening primrose glyceride). Preferred from the viewpoint of visual clarity are monocaprylate and monocaproate fatty ester derivatives of polyethylene glycol, or mixtures thereof, particularly materials such as PEG (6) caprylic/capryl glycerate (Softigen 767). Also preferred for use herein

are evening primrose derived fatty acid ester surfactants, such as PEG (60) evening primrose glycerides and almond oil derived fatty ester ester surfactants such as PEG (60) almond glycerides. Mixtures of glyceryl fatty ester surfactants can also be used herein.

A second class of nonionic surfactants suitable for use herein are ethoxylated fatty alcohols.

Examples of such materials include Oleth-10, Oleth-20, Laureth-7, Laureth-10, Laureth-12, Laureth-23, Steareth-10, Steareth-20, Steareth-21, Ceteareth-10, Ceteareth-20, Ceteth-10, Ceteth-20, and mixtures thereof.

Suitable fatty alcohol ethoxylate surfactants for use in compositions of the present invention comprise materials selected from compounds of the formula:



wherein x is 12, 14, 16 or 18, and n is 10, and mixtures thereof, and compounds of the formula:

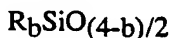


wherein x is 12, 14, 16 or 18 and n is 20, and mixtures thereof, and mixtures of A and B; such that the average HLB of the surfactant is at least about 12, and wherein if A and B are both present, they are at a ratio of A to B of from about 2:1 to about 1:2.

Another class of suitable nonionic surfactants for use herein include polypropylene glycol ("PPG") ethers of C<sub>4</sub>-C<sub>22</sub> (preferably C<sub>10</sub>-C<sub>20</sub>) fatty alcohols. Examples of such materials include PPG-2 myristyl ether, PPG-4 lauryl ether, PPG-10 cetyl ether, PPG-3 myristyl ether, PPG-11 stearyl ether, PPG-15 stearyl ether, and mixtures thereof. Additional examples are found in CTFA Cosmetic Ingredient Dictionary, Third

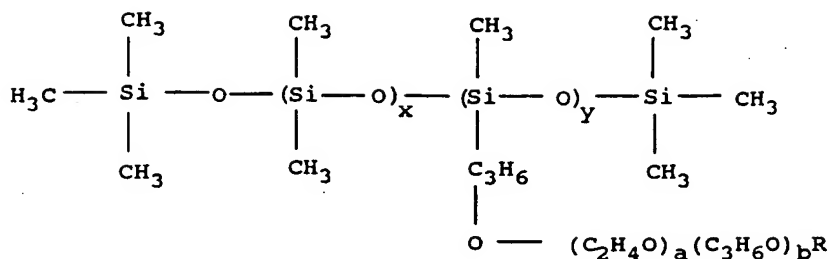
Edition (Extrin et al., Editors; The Cosmetic, Toiletry and Fragrance Association, Inc., 1982), pages 252-260 and 494-500.

Another class of nonionic surfactants suitable for use herein include polydiorganosiloxane-polyoxyalkylene copolymers containing at least one polydiorganosiloxane segment and at least one polyoxyalkylene segment, said polydiorganosiloxane segment consisting essentially of



siloxane units wherein b has a value of from about 0 to about 3, inclusive, there being an average value of approximately 2 R radicals per silicon for all siloxane units in the copolymer, and R denotes a radical selected from methyl, ethyl, vinyl, phenyl and a divalent radical bonding said polyoxyalkylene segment to the polydiorganosiloxane segment, at least about 95% of all R radicals being methyl; and said polyoxyalkylene segment having an average molecular weight of at least about 1000 and consisting of from about 0 to about 50 mol percent polyoxypropylene units and from about 50 to about 100 mol percent polyoxyethylene units, at least one terminal portion of said polyoxyalkylene segment being bonded to said polydiorganosiloxane segment, any terminal portion of said polyoxyalkylene segment not bonded to said polydiorganosiloxane segment being satisfied by a terminating radical; the weight ratio of polydiorganosiloxane segments to polyoxyalkylene segments in said copolymer having a value of from about 2 to about 8. Such polymers are described in US-A-4,268,499.

Preference for use herein are polydiorganosiloxane-polyoxyalkylene copolymers having the general formula:



wherein x and y are selected such that the weight ratio of polydiorganosiloxane segments to polyoxalkalkylene segments is from about 2 to about 8, the mol ratio of a:(a+b) is from about 0.5 to about 1, and R is a chain terminating group, especially selected from hydrogen; hydroxyl; alkyl, such as methyl, ethyl, propyl, butyl, benzyl; aryl, such as phenyl; alkoxy such as methoxy, ethoxy, propoxy, butoxy; benzyloxy; aryloxy, such as phenoxy; alkynyloxy, such as vinyloxy and allyloxy; acyloxy, such as acetoxy, acryloxy and propionyloxy and amino, such as dimethylamino.

The number of and average molecular weights of the segments in the copolymer are such that the weight ratio of polydiorganosiloxane segments to polyoxyalkylene segments in the copolymer is preferably from about 2.5 to about 4.0.

Suitable copolymers are available commercially under the tradenames Belsil (RTM) from Wacker-Chemie GmbH, Geschäftsbereich S, Postfach D-8000 Munich 22 and Abil (RTM) from Th. Goldschmidt Ltd., Tego House, Victoria Road, Ruislip, Middlesex, HA4 0YL. Particularly preferred for use herein are Belsil (RTM) 6031 and Abil (RTM) B88183.

The weight ratio of pre-emulsified silicone/polyglyceryl methacrylate lubricant to nonionic surfactant in the present composition is from about 20:1 to about 1:5, preferably from about 10:1 to about 1:2.

The compositions of the invention also preferably contain a humectant or mixture of humectants. The humectant or mixture of humectants is

preferably present in an amount from about 1% to about 40% by weight, more preferably from about 3% to about 30% by weight, and especially from about 3% to about 20% by weight. Suitable humectants for use herein include sorbitol, propylene glycol, butylene glycol, hexylene glycol, alkoxyated glucose derivatives, hexanetriol, glycerine (sometimes known as glycerol or glycerin) and glucose ethers. Preferably the humectant is selected from glycerine, alkoxyated glucose derivatives, propylene glycol, butylene glycol, and mixtures thereof. Chemically, glycerine is 1,2,3-propanetriol and is a product of commerce. One large source of the material is in the manufacture of soap. A preferred alkoxyated glucose derivative for use herein is Glucam (RTM) E-10 supplied by Amerchol Corporation, 136 Talmadge Road, PO Box 4051, Edison, NJ08818-4051 U.S.A. Glucam (RTM) E-10 is an ethoxylated glucose with excellent water retention properties. Highly preferred herein from the viewpoint of clarity are humectants or mixtures of humectants having a refractive index in the range from about 1.4 to about 1.5, preferably from about 1.44 to about 1.49, especially glycerine, ethoxylated glucose derivatives, propylene glycol and butylene glycol. Highly preferred compositions from the viewpoint of visual clarity contain humectant in a level of from about 1% to about 30%, preferably from about 3% to about 20%, more preferably, from about 5% to about 15%, especially when used in combination with acrylate thickeners as previously described in gel form compositions.

The weight ratio of pre-emulsified silicone/polyglycerylmethacrylate to humectant in the compositions herein is from about 20:1 to about 1:10, preferably from about 10:1 to about 1:5, especially from about 5:1 to about 1:3. The compounds of the present invention can additionally comprise mixtures of nonionic surfactant and humectant or mixture of humectants. The compositions of the invention are in aqueous gel or lotion form and are preferably formulated so as to have a product viscosity of at least about 4,000 mPa.s and preferably in the range from about 4,000 to about 300,000 mPa.s, more preferably from about 8,000 to about 200,000 mPa.s and especially from about 10,000 to about 100,000 mPa.s (25°C, neat, Brookfield RVT Viscometer, Spindle TB, 5r.p.m.).

The compositions are preferably substantially free of oil, i.e. contain less than about 1 %, and preferably less than about 0.1 % of materials which are insoluble or which are not colloiddally-soluble in the aqueous gel matrix at 20°C. It is a feature of the present invention that the skin- or hair-care compositions provide excellent moisturizing effectiveness, despite the fact that they contain no or low levels of insoluble emollient oils. "Colloiddally-soluble" herein refers to particles in the usual colloiddal size range, typically from 1 to 1000 nm, especially from 1 to 500 nm. In highly preferred embodimnts, the compositions are substantially free of materials which are insoluble or not colloiddally-soluble in distilled water at 20°C. Such materials include many conventional emollient materials such as hydrocarbon oils and waxes, glyceride esters, alkyl esters, alkenyl esters, fatty alcohols, certain fatty alcohol ethers and fatty acid esters of ethoxylated fatty alcohols, sterols extracted from lanolin, lanolin esters, wax esters, beeswax derivatives, vegetable waxes, phospholipids, sterols and amides. The compositions can, however, contain low levels of insoluble ingredients added, for example for visual-effect purposes, e.g. thermochromic liquid crystalline materials such as the microencapsulated cholesteryl esters and chiral nematic (non-sterol) based chemicals such as the (2-methylbutyl)phenyl 4-alkyl(oxy)benzoates available from Hallcrest, Glenview, Illinois 60025, U.S.A.

Other than the aforementioned nonionic surfactants the compositions of the invention have no need of and are preferably substantially free of surfactant materials which are conventionally added to cosmetic cream and lotion compositions in order to emulsify a water-insoluble oily phase. Again, "substantially free" means less than about 1 %, preferably less than about 0.1 % of the indicated materials.

A number of additional water-soluble materials can be added to the compositions of the invention. A highly preferred additional ingredient from the viewpoint of skin feel and tack reduction is a fluid copolymer of ethylene oxide and propylene oxide having a viscosity in the range of from 55 to 300,000 Saybolt Universal Seconds [S.U.S.], preferably from 100 to 2,000 S.U.S. at 38°C, for example Ucon Fluid 75-H 450.

Another optional but preferred ingredient of the compositions of the invention is trimethylglycine, otherwise sometimes known as betaine. Trimethylglycine is valuable herein from the viewpoint of providing improved skin feel and tack reduction. In the present compositions, trimethylglycine is preferably present at a level of from about 1% to about 10% by weight, preferably from about 3% to about 7% by weight.

The compositions of the invention can also contain from about 0.1% to about 10%, preferably from about 1% to about 5% of a panthenol moisturizer. The panthenol moisturizer can be selected from D-panthenol ([R]-2,4-dihydroxy-N-[3-hydroxypropyl]-3,3-dimethylbutamide), DL-panthenol, calcium pantothenate, royal jelly, panthetine, pantotheine, panthenyl ethyl ether, pangamic acid, pyridoxin, pantoyl lactose and Vitamin B complex. Highly preferred from the viewpoint of skin care and tack reduction is D-panthenol.

The compositions of the present invention can additionally comprise from about 0.001% to about 0.5%, preferably from about 0.002% to about 0.05%, more preferably from about 0.005% to about 0.02% by weight of carboxymethylchitin. Chitin is a polysaccharide which is present in the integument of lobsters and crabs and is a mucopolysaccharide having beta (1-4) linkages of N-acetyl-D-glucosamine. Carboxymethylchitin is prepared by treating the purified chitin material with alkali followed by monochloroacetic acid. It is sold commercially in the form of a dilute (approximately 0.1% to 0.5% by weight) aqueous solution under the name Chitin Liquid available from A & E Connock Ltd., Fordingbridge, Hampshire, England.

Other optional materials include keratolytic agents such as salicylic acid; proteins and polypeptides and derivatives thereof; water-soluble or solubilizable preservatives such as Germall 115, methyl, ethyl, propyl and butyl esters of hydroxybenzoic acid, EDTA, hexylene glycol, propylene glycol, Euxyl (RTM) K400, Bromopol (2-bromo-2-nitropropane-1,3-diol), and phenoxypropanol; anti-bacterials such as Irgasan (RTM) and phenoxyethanol (preferably at levels of from 0.2% to about 5%); soluble or colloiddally-soluble moisturising agents such as hylaronic acid and starch-grafted sodium polyacrylates such as Sanwet (RTM) IM-1000, IM-



1500 and IM-2500 available from Celanese Superabsorbent Materials, Portsmouth, VA, USA and described in USA-A-4,076,663; colouring agents; perfumes and perfume solubilizers etc. Water is also present at a level of at least about 50%, preferably at least about 70% by weight of the compositions herein.

The pH of the compositions is preferably from about 4 to about 9, more preferably from about 4.5 to about 7, the pH being controlled where necessary through the use of pH buffers such as citric acid/sodium citrate.

The invention is illustrated by the following examples.

Examples I to V

	I/%	II/%	III/%	IV/%	V/%
D-Panthenol	2	-	-	-	3
Lubrasil (RTM) <sup>1</sup>	10	10	10	10	5
PEG-6 capric/caprylic glyceride	2.00	-	1.0	1.0	-
PEG-60 evening primrose glyceride	1.00	1.0	2.0	-	2.0
ABIL (RTM) B 88183 <sup>2</sup>	1.00	1.5	1.5	-	-
Carbopol (RTM) 980 <sup>3</sup>	0.5	0.4	0.5	-	-
Stabileze (RTM) 06 (ISP)	-	-	0.4	0.5	-
Chitin Liquid	0.006	-	-	-	-
Sodium hydroxide	0.25	0.25	0.3	0.2	0.2
Methyl parabens	0.1	0.1	0.1	0.1	0.1
Germall 115	0.2	-	0.2	-	0.2
Hexylene glycol	2	-	-	-	2
Phenoxyethanol	-	-	-	0.25	-
Perfume Oils	0.001	0.0015	0.001	0.001	0.0006
Deionised Water	-----To 100-----				

1. Supplied by Guardian Chemical Corporation
2. Supplied by Th. Goldschmidt Ltd
3. Supplied G.F. Goodrich Company
4. Supplied by I.S.P. (Europe)

Examples VI to X

	VI/%	VII/%	VIII/%	IX/%	X/%
D-Panthenol	2	-	-	-	3
Lubrasil (RTM) <sup>1</sup>	5	10	10	10	10
PEG-6 capric/caprylic glyceride	-	-	1.0	-	-
PEG-60 evening primrose glyceride	1.00	-	2.0	-	2.0
Glucam E-10 <sup>5</sup>	6.00	10	7.5	10	6.0
Glycerine	-	-	-	10	-
ABIL (RTM) B 88183 <sup>2</sup>	-	1.5	-	-	-
Carbopol (RTM) 980 <sup>3</sup>	0.5	0.4	-	-	-
Stabileze (RTM) 06 (ISP) <sup>4</sup>	0.4	-	-	-	-
Chitin Liquid	0.006	-	-	-	-
Sodium hydroxide	0.25	0.25	0.3	0.2	0.2
Methyl parabens	0.1	0.1	0.1	0.1	0.1
Germall 115	0.2	-	0.2	-	0.2
Hexylene glycol	2	-	-	-	2
Phenoxyethanol	-	-	-	0.25	-
Butylene Glycol	2.0	2.0	2.0	-	-
Perfume Oils	0.001	0.0015	0.001	0.001	0.0006
Deionised Water	-----To 100-----				

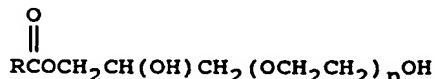
The compositions are made by mixing at ambient temperature.

The compositions display improved visual clarity, tackiness, moisturization, skin feel, skin care and residue characteristics together with excellent emolliency, rub in and absorption characteristics.

##### 5. Supplied by Amerchol Corporation

**CLAIMS**

1. A skin or hair care composition in the form of a clear, aqueous gel or lotion comprising:
  - a) from about 0.1 % to about 50 % by weight of pre-emulsified silicone/polyglycerylmethacrylate lubricant,
  - b) from about 0.01 % to about 20 % by weight of hydrophilic gelling agent , and,
  - c) from about 0.1 % to about 40 % by weight of alkoxyated, nonionic surfactant, said alkoxyated nonionic surfactant having a weight average HLB value of at least about 12.
2. A composition according to Claim 1 comprising from about 1 % to about 20 % by weight of the nonionic surfactant.
3. A composition according to Claims 1 or 2 wherein the nonionic surfactant is selected from polyethyleneglycol glyceryl fatty ester surfactants having the general formula



wherein n, the degree of ethoxylation, is from about 4 to about 200, and wherein R comprises an aliphatic radical having from about 5 to about 25 carbon atoms.

4. A composition according to Claim 3 wherein the nonionic surfactant has an average HLB value of at least about 14.
5. A composition according to any of Claims 1 to 4 wherein the weight ratio of pre-emulsified silicone/polyglycerylmethacrylate lubricant to nonionic surfactant is from about 20:1 to about 1:5, preferably from about 10:1 to about 1:2.
6. A skin or hair care composition in the form of a clear, aqueous gel or lotion comprising:

- a) from about 1% to about 30% by weight of humectant or mixture of humectants having a refractive index in the range from about 1.4 to about 1.5,
  - b) from about 0.1% to about 50% by weight of pre-emulsified silicone/polyglycerylmethacrylate lubricant, and
  - c) from about 0.01% to about 20% by weight of a hydrophilic gelling agent.
7. A composition according to Claim 6 comprising from about 5% to about 15% by weight of humectant or mixture of humectants.
  8. A composition according to Claim 6 or 7 wherein the humectant or mixture of humectant is selected from glycerine, ethoxylated glucose derivatives, propylene glycol, butylene glycol, and mixtures thereof.
  9. A composition according to any of Claims 6 to 8 wherein the weight ratio of pre-emulsified silicone/polyglycerylmethacrylate lubricant to humectant is from about 10:1 to about 1:5, preferably from about 5:1 to about 1:3.
  10. A composition according to any of Claims 1 to 9 comprising from about 3% to about 30% by weight of the pre-emulsified silicone/polyglycerylmethacrylate lubricant.
  11. A composition according to any of Claims 1 to 10 having a viscosity (25°C, neat, RVT Brookfield Viscometer, Spindle TB, 5r.p.m.) of from about 4000 to about 300,000 mPa.s, preferably from about 10,000 to about 100,000 mPa.s.
  12. A composition according to any of Claims 1 to 11 wherein the hydrophilic gelling agent has a viscosity (1% aqueous solution, 25°C, Brookfield RVT Viscometer, Spindle TB, 5r.p.m) of at least about 4000 mPa.s, preferably at least about 10,000 mPa.s.

13. A composition according to Claim 12 wherein the hydrophilic gelling agent comprises a crosslinked copolymer of polyvinylmethacrylate and methacrylic anhydride.
14. A composition according to Claim 13 comprising from about 0.05% to about 3%, preferably from about 0.1% to about 1% by weight of hydrophilic gelling agent.

## INTERNATIONAL SEARCH REPORT

International application No.

PC 93/09358

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC(5) :A61K 7/06 US CL :424/70 According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) U.S. : 424/70, 78.03; 514/944  Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) APS Search terms: polyglyceryl methacrylate, lubragel, silicone, non-ionic surfactant, lubrasil		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US, A, 5,000,868 (WITTPENN JR., ET AL.) 19 MARCH 1991, See columns 3-4.	1-4, 6-8
Y	US, A, 4,863,725 (DECKNER ET AL.) 05 SEPTEMBER 1989, See columns 1-3.	1-4, 6-8
Y	US, A, 4,826,828 (WILMOTT ET AL.) 02 MAY 1989, See columns 2-3.	1-4, 6-8
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
* "A" "E" "L" "O" "P"	Special categories of cited documents: document defining the general state of the art which is not considered to be part of particular relevance earlier document published on or after the international filing date document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) document referring to an oral disclosure, use, exhibition or other means document published prior to the international filing date but later than the priority date claimed	"T" "X" "Y" "Z" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art document member of the same patent family
Date of the actual completion of the international search 17 NOVEMBER 1993		Date of mailing of the international search report JAN 03 1994
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. NOT APPLICABLE		Authorized officer SALLY GARDNER Telephone No. (703) 308-2351

Form PCT/ISA/210 (second sheet)(July 1992)\*

**THIS PAGE BLANK (USPTO)**